3-1-2006

The Role of Experience in Discontinuance of IT Innovations

Rahul A.Gokhale
rahulg@clemson.edu

Ravi S. Narayanaswamy

THE ROLE OF EXPERIENCE IN DISCONTINUANCE OF IT INNOVATIONS

Rahul A. Gokhale
Clemson University
rahulg@clemson.edu

Ravi S. Narayanaswamy
Clemson University
ravin@clemson.edu

Abstract

While a number of different studies have explored the domain of adoption of IT innovations, factors leading to discontinuance of IT innovations have been sparsely explored. This paper attempts to fill this gap in the literature by examining the role of experience in the discontinuance of IT innovations. We focus on a very narrow segment of IT innovations; namely IT applications and their discontinuance by the end users. Drawing upon research done in marketing, we present the case that experience with a product as in a software application may play an important role in the end user's decision to discard or adopt the software application. Thus regardless of how functionally advanced and beneficial the application might be, limited experience on part of the end users may lead them to underestimate the overall value of the innovation and in turn lead them to discard an otherwise beneficial innovation. We suggest that discontinuance is most likely to occur when experience with an IT innovation is at a superficial level, while adoption is most likely to occur when the innovation is an integral part of the end user's needs. Organizational implications on how end users can be prevented from discarding IT innovations are presented.

Keywords: Discontinuance, Information Technology innovation, adoption of IT, Experience, Use, IT satisfaction

Introduction

Over the past 25 years Information systems field has witnessed an exponential growth in studies of adoption of information technologies (IT). As a result a multiplicity of theoretical streams have been used to understand adoption (the what, how, and why of adoption of IT) along various levels of analysis (e.g. individual, organizational, societal etc) (Jasperson, et al., 2005). Most of this prior work has, however, been confined to the domain of what factors lead to adoption, what are the processes through which adoption takes place (cf. work on institutional perspectives of adoption), the different stages of adoption, and an explication of the issues and relationships pertaining to adoption. While informative and insightful this work has sparsely addressed issues of post adoption behavior regarding an innovation. Post adoption use is an important next step in innovation research for it might explain a crucial phenomenon of discontinuance after adoption. Discontinuance of products/services is an important question for at least three reasons. First discontinuance of a product usually implies lost revenues (Rust and Zahorik, 1993). Second, discontinuance of products/services is likely to signal further loss in revenues through additional discontinuance (Arndt, 1967; Oliver, 1995), and by preventing adoption of the product/service (Ridgeway and Price, 1994). Third acquiring new customers for an innovation is a expensive and time consuming strategy (Ridgeway and Price, 1994) and as research on customer loyalty has shown it is cheaper to retain loyal customers and be more profitable than to acquire new ones (Oliver, 1980). Arguably these three benefits are not likely to occur in all kinds of innovations [e.g. internal innovations for improving employee productivity], so we only focus on "external innovations" like computers or software designed for the purpose of generating revenues.

In the case of complex products like IT products/services the adoption decision and the discontinuance decision are usually discreet. This implies that the same factors that led to adoption might or might not be able to account for the decision to adopt and the decision to discontinue. Customers usually look for some general cues while adopting a product (like perceived usefulness), but they might use more specific experience based cues after purchase. Along the same lines an individual may use the product quite differently from what was originally intended, or in some cases might actually find the innovation to be incompatible with existing needs. Thus experience which has been hitherto treated sparsely may play a central role in understanding discontinuance. On this note pose our broad research question as: *What role does experience play in explaining the intent to discontinue an IT innovation*?

Typology of Experience

Experience has been conceptualized as being highly correlated with use in prior work. Higher use of an innovation, post adoption, should lead to a higher and richer experience with the product or service. This definition of experience suggests that it can be conceptualized in two basic ways; variety of use and rate of use (Dutton, et al., 1985; Ram and Hyung-Shik, 1989). Variety refers to the different ways in which an innovation is used or put to test [or different features of the product/service are used] by the customer. Usage rate refers to how often the product is used regardless of the number of ways in which it might be used. These two dimensions can be combined to formulate four different types of uses.

Intense Use

Describes experience situations in which an innovation is used to a significant degree both in terms of rate of use and the variety of uses (number of applications or functional diversity of an innovation). In effect the user is spending considerable amount of time and applying the innovation for different tasks (Dutton, et al., 1985; Lindlof, 1991; Lindlof, 1992)

Experimental Use

Describes experience situations in which the variety of use is more critical than the rate of use. Such a pattern best describes usage of a new innovation when the user is involved in a trial and error process to determine the task-technology fit (Goodhue and Thompson, 1995)

Specialized Use

Describes experience situations in which the rate of use is higher than the variety of use. Here the focus is on treating the innovation either as a specialized tool to carry pre-determined activities or routine tasks. This situation also refers to the mundane use or sometimes non-critical use of innovations after it has been established that the task technology fit is appropriate (Tinnell, 1985). In specialized use, the functionality offered by the product is not critical since only small sets of tasks are performed regardless of the overall utility accorded by the innovation.

Low Use

Describes experience situations where both the variety and the rate of use is scarce. That is the user finds little if any worthwhile application of the innovation and delegates it to the role of "a tool performing minor functions when nothing else is available at hand". In this kind of use, the innovation is essentially discounted or discarded by the user (Lindlof, 1992).

Research Model

We next propose the rationale for each of the constructs and the relationships depicted in our research model. This is followed by a derivation for different hypotheses. Note that in the model, use is treated as synonymous with

experience. That is the kind of use a "user" puts an innovation to will also determine the kind of experience the user has with the innovation. This will subsequently lead to compatibility and satisfaction, which in turn leads to discontinuance.

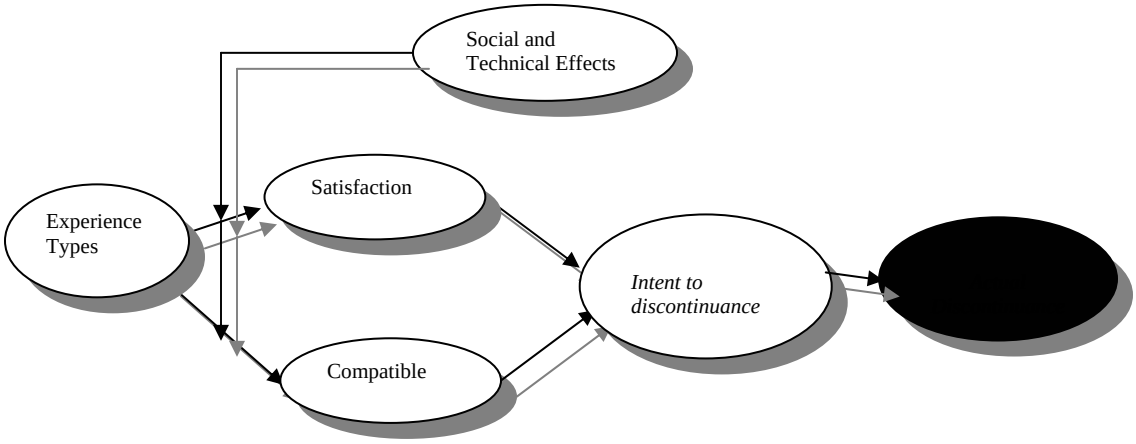

Figure 1. Research Model of Discontinuance

Propositions

Our research model posits that the kind of experience that a user will have with a given innovation will influence perceptions about the compatibility and satisfaction of the innovation to the user. This combination of compatibility and satisfaction is argued as influencing the intention to continually adopt an innovation.

Table 1. Impact of Experience on Satisfaction and Compatibility of an Innovation

		Rate of Use	
		H	**L**
Variety	**H**	High satisfaction and higher compatibility	Indeterminate
	L	Higher compatibility but low to high satisfaction	Low compatibility and low satisfaction

How users make use of technology directly affects the nature and level of perception regarding the technology. Users perceptions can be further divided into perceptions about satisfaction with the technology and the compatibility of the technology with the needs of the user'. In the first case it has been suggested that a user's ability to use a product successfully affects their evaluative response to the product (Ellen et.al, 1991). Further, it is generally assumed that greater experience results in greater satisfaction with a product, and to greater feelings about the perceived usefulness of a product (Kekre, et al., 1995).

Experience Types and Extent of Satisfaction/Compatibility

Intense Use

Dutton (1985) argues that experiences about a product can be vastly different based on the variety of ways a product is used and the rate of usage. Intense use is characterized by both a high variety of use and a high rate of use. Higher variety implies that the probability that a user will explore different features of a product is high. This means that the

different functional features of a product are explored and exploited; not only providing the user with rich experience and knowledge about a product, but also initiating a kind of symbolic interaction that enhances the perception of compatibility of a product/service. Rate of use can be both directly and indirectly tied in to variety of use. Firstly, a high rate of use implies that a product might serve both the different functional needs of the user (a multi-utility product/service) and it might also serve the more mundane needs of a user. Secondly, a high rate of usage creates a feedback effect by tying the user to the product and encourages her/him to further explore the multi-functional nature of the innovation. Under these circumstances we can deduce that both the utility of a product is high and that the user might be "bonded" to the innovation through symbolic interactions. Thus we propose —

P1: Intense use of an innovation will be positively associated with a high perception of satisfaction and a high perception of compatibility with the innovation, and hence an intention to continually adopt an innovation

Specialized Use

Specialized use refers to the kind of experience when the user has some degree of "a-priori" information regarding the compatibility of the innovation. It also refers to a very narrow use of the product/service. The effects of specialized use are more complex to determine than intense use. However, Oliver (1980) and Oliver (1995) suggest that customer satisfaction with a product/service is to some extent a function of how well the product meets the needs of a customer. In other words the compatibility of an innovation might influence satisfaction to a certain extent. This however does not imply that satisfaction both satisfaction and compatibility be high. Further Dutton (1985) states that there are two specialized use essentially reflects a high rate of use. If this is true, then, specialized use occurs when carrying out pre-determined activities that are best accomplished by a particular product. A second reason for why usage might be high is when the types of tasks carried out with a tool are mundane and are performed regularly. In the first case, alternatives might not be available because of product compatibility. Also, satisfaction might be high because a user now evaluates the product from a narrow perspective. In the second case, alternative products might be freely available and the user might not pay too much attention to an innovation because it forms or serves a non-critical part of his activities. These arguments allow us to see that when specialized use is "high" because of non-substitutability of a product the user will find the product to be compatible but may or may not find it satisfying to use. Further, when specialized use is "high" because the product is serving a non-critical part of daily activities, the compatibility will be high, but satisfaction will not be related to compatibility. Thus we propose — Narrow use case for pre-determined or critical tasks:

P2a: Specialized use will be positively associated with compatibility, but not necessarily satisfaction and will not lead to intent to discontinue an innovation

P2b: Specialized use will be positively associated with compatibility, but not satisfaction and will be positively associated with intention to discontinue an innovation

Experimental Use

In the case of experimental use a user is merely testing the product/service. To that end the variety of use is high (as new product features are being explored), but the rate of use is low because the innovation is not used to perform either pre-determined activities or is not a part of daily routines. Having said this, the effect of experimental use cannot be determined "a-priori", but is rather based on the degree of satisfaction the user has with the functionality of the innovation and the compatibility of the innovation features with the needs. It is evident that experimental use by itself cannot determine the decision to discontinue. Rather, this use will either lead to intense use or specialized use based upon the perceptions of compatibility and the satisfaction with the innovation. Thus we propose —

P3: Experimental use will not be associated with the intent to discontinue an innovation. Experimental use will be associated with either specialized use or intense use.

Low Use

A low use implies both that the rate of use and the variety of use is low for a innovation. In other terms, the innovation is neither compatible, nor satisfactory for the user and the next opportunity that provides a better alternative will replace the existing innovation. We formally propose:

P4: Low use will be negatively associated with perceptions of satisfaction, and compatibility and will lead to intent to discontinue the innovation.

Moderators in Our Research Model

Social Effects

Kwon and Zmud (1987) implicitly suggested that social factors could influence intentions to discontinue. They defined social factors in terms of social approval and communication about an innovation. The theory of reasoned action similarly proposed social norms as an important factor in the formation of attitudes and intentions. While authors using these two concepts have used many subtle definitions, the underlying social approval theme is whether people closely associated with an individual approve the use of an innovation. Similarly, communication has also been used in a wide variety of ways: starting from its use as " the ease with which benefits about an innovation can be communicated", to the more specific form of "inter-personal communication" which covers a wide range of communication patterns albeit among individuals who are closely knit together in everyday life. Because our focus is on individual level factors we adopt the "nature of interpersonal communication" as representing social approval or social effects in general. This is so because social approval can only be made known through the use of communication. Indeed the diffusion of innovations literature has for long stressed the importance of interpersonal communication (Rogers, 1995). Interpersonal communication has been conceptualized as the intensity of communication in prior work (Rogers, 1995). Our discussion of interpersonal communication suggests that it can act as both a precursor to type of use and also as a moderator to use. Communication as an antecedent is better when we are trying to predict adoption; it is better as a moderator when we are trying to study discontinuance because adoption has already occurred. Thus we propose —

P5: Social effects will moderate the relationships between types of experience and perceptions of satisfaction/compatibility

We now split P5 into two sub hypotheses: each associated with the type of experience. Under conditions of intense use, an adopter is involved in a close symbolic relationship with the innovation. To that end his perceptions about the knowledge he holds on that innovation will largely out perform what others have to say about the innovation. Further, in intense use the innovation has already proven its worth so: assuming others communicate negatively:

P5A: Social effects (Negative) will have no effect on the relationship between intense use and satisfaction or compatibility about an innovation.

In specialized type of experience, use variety is low, but rate of use is high. Further, specialized use could be either mundane tasks or critical tasks. In mundane tasks the user can switch to an alternative if the switching costs associated with an innovation are not too high. In other words a high rate of use is associated primarily with compatibility and not satisfaction. Therefore there is no symbolic interaction between the user and the innovation that will increase the switching costs in the event of negative social effects. This same logic also applies to experimental and Low use. Therefore we propose:

P5B: Social effects (Negative) will have a significant effect on the relationship between intense use and satisfaction or compatibility about an innovation.

Technical Effects

Technical effects are categorized for our purpose into two dimensions. The first dimension is associated with complexity of the technology. In the parlance of Kwon and Zmud (1987) this is defined as the degree of difficulty involved in understanding and learning about the innovation. The second dimension relates to functional advancement. Functional advancement reflects the technological sophistication of the innovation in question. Further IT innovations are complex and functionally advanced, or have either one of these dimensions. Complexity and functional advancement (hereafter referred a sophistication) determines the possible use of an innovation-post adoption. Studies have shown that some users are slow in experiencing innovations (i.e. they adopt slowly and are

resistive to change in sophistication), while some others welcome sophistication and are responsive to changes in technology and the way in which it is put to use (Norman, 1999). Logically stated complexity should be a deterrent while functional advancement should be endorsed. Complexity implies additional burden in terms of time and other costs; at the same time functional advancement might imply doing more with less, while avoiding the costs associated with high complexity. In general the results are equivocal about whether sophistication matters. We propose that —

P6A: Technical effects characterized by complexity will be associated with negative perceptions about satisfaction and compatibility of an innovation

P6B: Technical effects characterized by functional advancement but not complexity will be associated with positive perceptions about satisfaction and compatibility of an innovation

Discussion

We have outlined that the different types of uses can be a determinant of intent to discontinue. While these experiences to an extent stem from the features associated with an innovation, it is equally clear that regardless of the functionality of the product or its compatibility with the needs of a user, an innovation might still be discarded simply because "the user did not have a positive perception about the innovation in the small amount of time that was available to explore the product/service". Thus an inability to "experience" a innovation wither out of time, or due to other factors might actually lead to rejection of a appropriate innovation. The level of perception about satisfaction and compatibility of a product that a user has (given the limited amount of time) usually will determine the resistance to adoption of an alternative innovation and hence the likelihood of discontinuing the existing innovation (Ellen, et al., 1991). Users who have successfully integrated the innovation as a part of their lifestyle are less likely to switch than those who treat the innovation as a superficial and boundary condition in their life. Practically this translates into the idea, that no matter how functionally advanced a product/service is, and how compatible it is, an innovation cant taste the fruits of success if it does not express its complexity in the form of easily accessible attributes. Further, the makers of an innovation should attempt to train the user in a way such that s/he is encouraged to move from the stage of experimental usage to either specialized use or preferably intense use. We have delineated some of the effects that might lead to intent to discontinue: hopefully these effects can be manipulated in practice. For instance social approval occurs primarily through communication with others. If organizations could improve their advertising and marketing campaigns such that perceptions of approval are positive, they can actually attempt to manipulate this effect. A key point is the word about the innovation has to spread consistently over long periods of time. Similarly individual effects are another issue that is indirectly manipulated by versioning of innovations. By understanding general profiles of individuals based on factors like "personality types, age, and education" organizations can provide different versions that are likely to appeal to a wider population. Technical effects are the easiest to manipulate because the control lies in the hands of the innovator. Conducting feedback surveys and field studies might help innovators to improve functional properties and help make complex innovations more users friendly.

References

Anderson, R. L., & Ortinau, D. J. (1988). Exploring Consumers' Post adoption Attitudes and Use Behaviors in Monitoring the Diffusion of a Technological-Based Discontinuous Innovation. *Journal of Business Research, 17*, 283-298.

Arndt, J. (1967). Role of product related conversations in the diffusion of a new product. *Journal of Marketing research, 4*(8), 291-195.

Cavill, M. (1999). Towards an Understanding of Sustainable Regional Telecommunications-enabled Communities. Unpublished manuscript, Melbourne, Australia.

Chuan-Fong, S., & Alladi, V. (2004). Beyond Adoption: Development and Application of a Use-Diffusion Model. *Journal of Marketing, 68*(1), 59-72.

Downing, C. E. (1999). System usage behavior as a proxy for User satisfaction: An empirical Investigation. *Information and Management, 35*, 203-216.

Dutton, W., Peter, K., & Stienfield, C. (1985). Computing in the home: A Research Paradigm. *Computers and Social Sciences, 1*, 5-18.

Ellen, P., Bearden, S., O.William, & Sharma, S. (1991). Resistance to technological innovation: An examination of the role of self efficacy and performance. *Journal of Academy of Marketing Science, 19*(4), 297-307.

Goodhue, D.L., & Thompson, R.L.(1995). Task-technology fit and individual performance. *MIS Quarterly, 19(2), 213-236.*

Jasperson, J., Carter, P. E., & Zmud, R. W. (2005). A comprehensive conceptualization of post-adoptive behaviors associated with information technology enabled work systems. *MIS Quarterly, 29*(3), 525-557.

Karahana, E., Straub, D. M., & Chervany, N. L. (1999). Information Technology Adoption across Time: A Cross-Sectional Comparison of Pre-Adoption and Post-Adoption Beliefs. *MIS Quarterly, 23*(2), 183-213.

Kekre, S., Mayuram, S. K., & Srinivasan, K. (1995). Drivers of Customer Satisfaction for Software Products: Implications for Design and Service Support. *Management Science, 41*(9), 1456-1470.

Kwon, T. H., & Zmud, R. W. (1987). Unifying the Fragmented Models of Information Systems Implementation. In R. J. Borland & R. A. Hirschiem. (Eds.), *Critical Issues in Information Systems Research* (pp. 252-257). New York: John Wiley:

Lindlof, T. R. (1991). New Communication Media and the Family: Practices, Function, and Effects,. In B. Dervin (Ed.), *Progress in Communication Science* (Vol. 10). Norwood, NJ: Ablex Publishing.

Lindlof, T. R. (1992). Computing Tales: Parents' Discourse about Technology and Family. *Social Science Computer Review, 10*(3), 291-309.

Norman, D. A. (1999). *The Invisible Computer*. Cambridge: Massachusetts Institute of Technology Press.

Oliver, R. L. (1980). A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions. *Journal of Marketing Research, 17*(4), 460-469.

Oliver, R. L. (1995). Attribute Need Fulfillment in Product Usage Satisfaction. *Psychology and Marketing, 12*(1), 1-17

Poon, S., & Swatman, P. M. C. (1998). An Exploratory Study of Small Business Internet Commerce Issues. *Information and Management, 35*, 9-18.

Ram, S., & Hyung-Shik, J. (1989). The Link Between Involvement, Use Innovativeness and Product Usage. In T. K. Srull (Ed.), *Advances in Consumer Research* (Vol. 16, pp. 160-166). Hawaii: Association for Consumer Research.

Ridgeway, N. M., & Price, L. L. (1994). Exploration in Product Usage: A Model of Use Innovativeness. *Psychology and Marketing, 11*(1), 69-84.

Rogers, E. M. (1995). *Diffusion of Innovations* (4 ed.). New York: The Free Press.

Tinnell, C. S. (1985). An Ethnographic Look at Personal Computers in the Family Setting. *Marriage & Family Review, 8*(1), 59-69.